Muse^3

USER MANUAL

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Dear MAC PARA pilot

We congratulate you on your purchase of a MAC PARA paraglider. Extensive development work and numerous tests make the Muse 3 a high performance intermediate paraglider with maximum possible safety. The Muse 3 is constructed for thermal and cross-country flying, and will enable pilots to get maximum enjoyment. The Muse 3 offers very easy inflation and simple ground-handling characteristics by take off, excellent handling in flight and easy landing. Please read this manual carefully before you start, this way you will get the most out of your glider, and enjoy many nice flights. MAC PARA wish you many pleasant flights with your Muse 3.

Please read this manual carefully and note following details:

Paragliding is a sport, which demands, besides the optimum equipment, a high degree of attentiveness, good judgement, and theoretical knowledge. Paragliding can be a dangerous sport, which may lead to injury and death. This paraglider meets at the time of delivery requirements of the EN (European Norm) 926 or LTF (German Certificate of Airworthiness). Any alternations to the paraglider will render its certification invalid! The use of this paraglider is solely at the user's own risk! Manufacturer and distributor do not accept any liability. Pilots are responsible for their own safety and their paraglider airworthiness. The paraglider carries no warranty! The author assumes that the pilot is in possession of a valid paragliding licence for glider's category, insurance etc.

Before delivery, as well as during production, each paraglider goes through a strict visual inspection, and is test-flown by your dealer. Stamps on the placard, together with a completed test-flight certificate, confirm this. Check that the paraglider has been test-flown before your first take-off. If it has not, consult your dealer.

Any inadequate use or misuse increases the risks considerably. The Muse 3 must not be used outside the certified weight range. The Muse 3 must not be used during rain or snow-fall. The Muse 3 must not be used in high or gusty winds. The Muse 3 must not be used in cloud and fog. The Muse 3 must not be used by pilots without sufficient knowledge or experience.

If, after carefully reading this handbook, you still have questions, suggestions or criticism regarding this product do not hesitate to contact your dealer or us. We will be glad to help and advice.

MAC PARA wish you many pleasant flights with your Muse 3

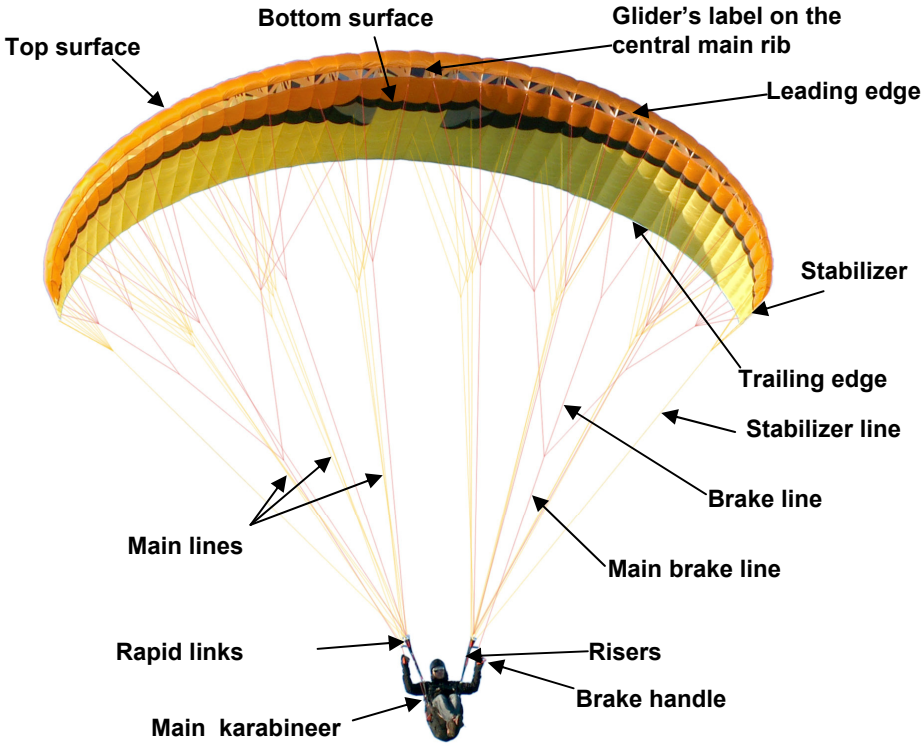
Version 1.0 Stand 1.04.2011

Operating limits:

The Muse 3 has been tested by certification laboratory European Para Academy to LTF/ EN-A category. The Muse 3 is certified for solo flight. The Muse 3 has been load and shock-tested and passed with a load corresponding to 8G of the maximum weight in flight 135 kg. Its flying tests have shown that the glider remains stable and controllable over a wide range of normal and abnormal flight conditions. Nevertheless, turbulence and gusting winds can lead to a partial or complete collapse of the canopy. Therefore never fly in such conditions.

Any changes made to this paraglider invalidate the certificate of airworthiness.

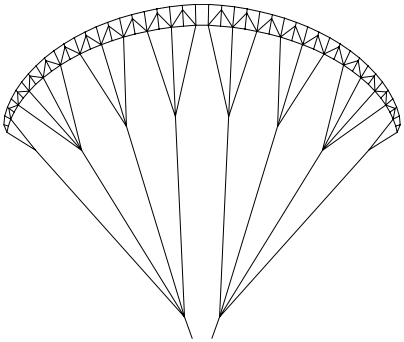
OVERALL PLAN

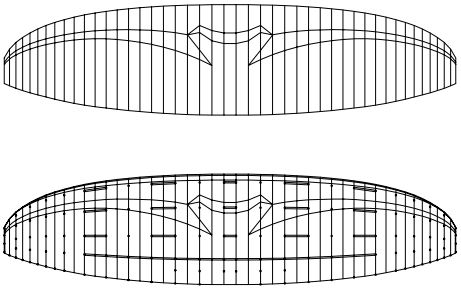


Construction of the canopy:

The canopy of the MUSE 3 consists of 52 cells over the wingspan. The wingtips are slightly pulled down and this produces a kind of stabilizer. The Muse 3 is a second rib diagonal-construction paraglider. Every second main rib is attached to the 4 or 5 suspension lines. Between these main suspension ribs, intermediate ribs are suspended by diagonal segments. These segments do not lead to top surface of canopy but are attached at 80% of rib's height. This construction ensures a smooth top surface and precise airfoil reproduction. The internal reinforcements maintain the precise form of the canopy and provide stability. The cell openings on the under-surface of the profile's nose provide airflow into the glider. Stretch resistant flares, integrated with diagonal ribs at the suspension points, ensure an even distribution of load throughout the canopy. A stretch resistant Mylar strip on the top and bottom panels alongside the openings and running the length of the trailing edge defines the wingspan, together with an optimized sail tension; this guarantees a high form stability. Large cross ports allow effective airflow inside the canopy, providing good re-inflation without reducing the profile accuracy..

The Muse 3 is mainly made of the proven Nylon fabrics Porcher Marine Skytex Rip-stop 9092 E85A, 9017 E38A and 9017 E29A. Like any synthetic material, this can deteriorate through excessive exposure to UV.





Rigging system:

The lines of the Muse 3 are made of proven strong and stretch resistant Polyester HMA Aramid/Kevlar (yellow core) lines and PES/Dynema (white core) lines. The entire rigging system comprises individual suspension lines looped and stitched at each end. The Arami/Polyester main lines have strengths from 160 up to 240 kg. The Aramid cascade lines have strengths from 60kg up to 80 kg. The Dynema brake lines have strengths from 100kg up to 240 kg

The suspension lines are comprised of “cascaded top lines” (attached to the under-surface) and “main lines”. Main lines lead to the “quick link” (a Maillon which connects lines and risers). The “stabilizer lines” connect the upper stabilizer lines on the outer suspension points with the quick link. The”brake lines” are not load carrying suspension lines. They lead from the trailing edge of the canopy to the main brake lines and run through the pulleys on the D-risers to the brake handles. A mark on the main brake line indicates the position of the brake handle. This adjustment, on the one hand, allows sufficient brake to be applied during extreme flying situations and when landing, while on the other hand, this ensures that brakes are not permanently applied to the canopy (especially when fully accelerated). This trimming should not be altered. For differentiation purposes the A-lines are coloured red, the brake lines are orange, all remaining lines are yellow. Also the main suspension loop, on the bottom of the riser, is covered red. This is where the main karabiner should be hooked in, which then in turn connects the risers to the harness.

The Muse 3 is equipped with 5 risers per side (A, A1, B, C, D). The two central A-lines per side are attached to the main A-risers while outermost A main lines are attached to A1 risers. The 3 B-main lines and the stabilizer lines are attached to the B-riser. The 3 C-main lines to the C-riser. The 3 D-main lines to the D-riser. The main brake lines leads through the pulleys on the D riser.

The line connections are made to triangular Maillons (quick links) fitted with a rubber ”o- ring” in the form of a ”figure eight” which prevents any slipping of the lines on the quick link.

See line plan for details

Speed system:

The Muse 3 is equipped with a stirrup operated speed-system, which returns automatically to normal position when the stirrup is released. The serial risers of the Muse 3 do not have a lockable trimmer.

The speed system affects the A-, A1-, B- and C-risers and changes the angle of attack. In normal flight all risers have an overall length of 50 cm without quick links. When the stirrup is pushed out the A-risers are shortened by up to a maximum of 16 cm, the A1-risers are shortened by up to a max of 16 cm, the B-risers by up to a max. of 14 cm, the C-risers by up to a max. of 7 cm, the D-risers retain their original length. These measurements influence the certification! An incorrectly fitted speed system causes loss of certification!

Fitting the speed-system:

Most modern harnesses have pulleys attached for speed system fitting. In case not, it is important to attach pulleys (sewn on tabs) in such a way that they allows the pilot to maximize the power vector of his / her legs without ”pushing back” in the harness.

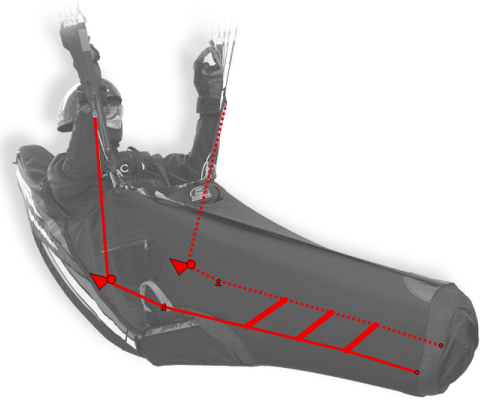
The Muse 3 speed system, including Brummel-hooks supplied, must be assembled as per instructions.

The speed system cord is firmly attached (use bowline or other nonslip knot) to the foot stirrup (webbing or alloy bar). The other end of the cord is run through a pulley on the harness and then in an upward direction to be then firmly attached to the Brummel-hooks!

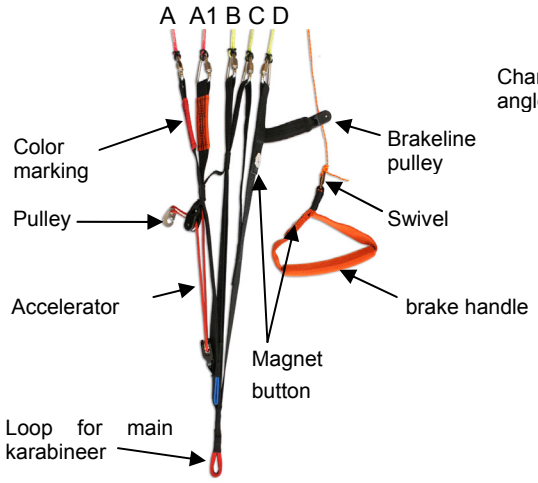
The length of the cord leading to the stirrup should be adjusted so that it is easy to put your feet into the stirrup in flight but still short enough to allow full speed system travel. (Use of 2 stirrups in a ladder fashion can enable you to reach the full range if your legs are not long enough.) Ensure both cords on the stirrup are of equal length, to avoid putting a turn in the glider.

Test your speed system for the correct length of cord on the ground first (simulating flying position), with your harness and risers, before flying with it! The full range is reached when the 2 pulleys join together.

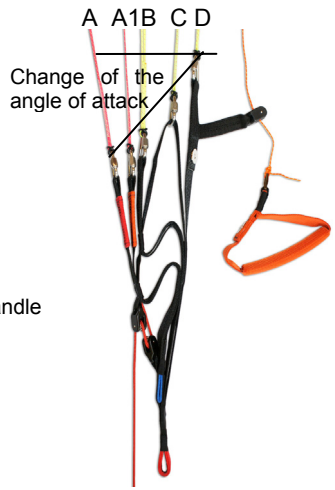
Before launch, attach the paraglider's risers to the harness with the main karabiners. Then attach the ”Brummel-hook” on the end of each speed system cord to the Brummel hook on the end of the cord which runs through the 2 pulleys on the A risers. Ensure that the speed system is untangled and operates freely before flying!



RISER



Trimm postion



Accelerated position

Slower **Faster**

Risers's lenghts Muse 3

	A	A1	B	C	D
Trim-position	**520**	**520**	**520**	**520**	**520**
Accelerated	**360**	**360**	**380**	**450**	**520**

The lengths are measured from main attachment point to the lower edge of rapid links.

MATERIALS

Tissue

(PORCHER SPORT, Rue du Ruisseau B.P. 710,38290 ST. QUENTIN FALLAVIER, FRANCE)
Top Sail - Leading Edge - SKYTEX 45 E85A - 100% nylon 6.6 , 33 Dtex, 45 g/m^2
Top Sail - Trailing Edge - SKYTEX 40 E38A - 100% nylon 6.6 , 33 Dtex, 40 g/m^2
Bottom Sail - SKYTEX 40 E38A - 100% nylon 6.6 , 33 Dtex, 40 g/m^2
Main ribs, Diagonals - SKYTEX 40 E29A - 100% nylon 6.6 , 33 Dtex, 40 g/m^2
Ribs - SKYTEX 40 E38A - 100% nylon 6.6 , 33 Dtex, 40 g/m^2
Reinforcement Main Ribs - Grille Polyester 200 g/m^2
Reinforcement Ribs - W382 Polyester 180 g/m^2

Lines

(EDELMAN+RIDDER+CO. Achener Weg 66, D-88316 ISNY IM ALLGEAU, GERMANY)
Upper lines A,B,C,D - Aramid/Polyester A-6843-080, Breaking Load 80 kg
Upper lines D,E - Aramid/ Polyester A- 6843-060, Breaking Load 60 kg
Main lines C1,C2,C3,D1,D2,D3 - Aramid/ Polyester A-6843-160, Breaking Load 160 kg
Main lines A1,A2,A3,B1,B2,B3 - Aramid/ Polyester A-6843-240, Breaking Load 240 kg
Wing tip lines - Aramid/ Polyester A-6843-080, Breaking Load 80 kg
Brake lines - Dynema/Polyester A-7850-100, Breaking Load 100 kg
Main brake line - Dynema/Polyester A-7850-240, Breaking Load 240 kg

Attachment straps

(STUHA a.s., DOBRUSKA, CZECH REPUBLIC)
STAP-POLYESTERBRIDLE 13 mm, Breaking Load 70 kg

Risers

(MOUKA, tišnoc, Czech Republic)
Polyester 366 005 025, 25 mm, Breaking Load 900 kg

Thread

(AMANN SPONIT ltd, Dobronická 635, 148 25 PRAHA 4, CZECH REPUBLIC)
Lines-SYNTON 60, Main lines-SERABOND 60, Canopy-SYNTON 40, Riser-SYNTON 20

Rapid links

(ELAIR SERVIS, CZECH REPUBLIC)
NIRO TRIANGLE 200 - Max. Load 200 kg

TECHNICAL SPECIFICATIONS

Category Intermediate size		Muse^3 24 (S)	Muse^3 26 (M)	Muse^3 28 (L)	Muse^3 31 (XL)
Zoom flat	[%]	92	95,7	100	104,5
Area flat	[m^2]	23,75	25,7	28,06	30,64
Area projected	[m^2]	21,78	23,56	25,73	28,1
Span flat	[m]	10,90	11,34	11,85	12,38
Aspect ratio flat	-	5,0	5,0	5,0	5,0
Root cord	[m]	2,69	2,79	2,92	3,05
Cells	-	45	45	45	45
Weight	[kg]	4,95	5,1	5,3	5,6
Weight range*	[kg]	67-85	75-95	85-110	105-135
Min.speed	[km/h]	23-25	23-25	23-25	23-25
Trim.speed	[km/h]	36-38	36-38	36-38	36-38
Max. speed (accelerator)	[km/h]	45-47	45-47	45-47	45-47
Glide ratio	-	8,3	8,3	8,3	8,3
Min. Sink rate	[m/s]	1,05	1,05	1,05	1,05

* Pilot + approx. 17 to 20kg of equipment (including wing)

HARNESS

The Muse 3 is certified with LTF GH type certified harnesses. Nearly all harnesses available on the market are „GH“.

These “GH“harnesses are different to “GX“ harnesses, which have a lower attachment point for the main karabiners and effective cross bracing. The Muse 3 was not tested with harnesses with an effective cross bracing system.

Any certified harness with a hang point at about chest height may be used with the Muse 3 (37-50cm over seat plate). The distance between left and right main karabiners should be between 45 and 60cm, depending on the size of the pilot and the type of the harness. Please note: the hang point position changes the position of the brakes relative to the pilot's body.

CHECKS ON THE NEW PARAGLIDER

Before delivery, as well as during production, each paraglider goes through a strict visual inspection. Additionally we recommend that you to check your new glider in accordance with the following points. We recommend that you make this check after flying extreme manoeuvres or after tree landings or similar.

- Inspection of the canopy for tears or damage, especially the seams which join the ribs to the upper and lower surfaces, but also the area of the attachment tapes and brake-line connections.
- Inspection of the lines for damage to the stitches. The line lengths must be checked after 50 hours flying time and whenever the flight behaviour of the glider changes.
- Inspection of attachment tapes for damage to the stitches. It is also important to check the attachment tapes and brake-lines for tangles.
- Inspection of the risers for faultless condition. Rapid links must be secured.

With even slight damage the glider loses its airworthiness

ADJUSTING BRAKE LINES

The brake lines lead from the trailing edge of the canopy to the main brake lines which then run through pulleys on the D-risers to the brake handles. A mark on the main brake line indicates the position of the brake handle.

The glider is delivered with a standard set-up and its speed can reach 36 - 38 km/h depending on the weight of the pilot. The brake-lines should always be adjusted so that the first brake-lines just come under tension when the brake handles have been pulled 5 - 10 cm. The test results relate to this brake-line adjustment. This adjustment, on the one hand, allows sufficient brake to be applied during extreme flying situations and when landing, while on the other hand, it ensures that the canopy is not permanently braked (especially when fully accelerated). This trim should not be altered. In extreme situations any other settings may lead to the glider reacting differently to versions which have been tested.

NOTE!! If in doubt about the brake-line adjustment, it is preferable to leave them too long, as any necessary shortening can easily be achieved by wrapping them round your hand.

FLYING THE MUSE 3

The following information must not under any circumstances be taken as a manual for practising paragliding. We would like to advise you of the Muse 3's features and important information for your flying and security.

Preparing for take off:

As for any aircraft a thorough pre-flight check must be made prior to each flight on the Muse 3!

Before every launch check lines, risers and canopy for damage! Do not launch with even the slightest damage!

Also check the maillons connecting the lines and the risers. They have to be closed tight.

Put on the harness with maximum care and check the handle of the safety system and that all the flaps of the outer container are fastened securely and correctly. The main karabiner must also be checked carefully. Replace it if any damage is visible, or generally after 300 flying hours. Finally connect the risers to your harness with the main karabiners.

Check carefully that they are properly closed.

Attention! Never fly with an open main karabiner! Do not take off if you find any damage on your equipment!

Having unpacked and laid out the paraglider in a slight horseshoe pattern the following checks must be made

Checklist:

Preparing the wing:

- canopy without any damage
- risers without damage
- maillons (quick links) closed tight
- stitching of the main lines near the risers are o.k.
- all main lines run free from the riser to the canopy, brake lines are free

Putting on the harness:

- rescue handle and deployment pins secure
- buckles (leg- ,front riser) closed
- main karabiners

Before takeoff:

- speed-system mounted and connected properly
- risers not twisted
- brake handle in hands, brake lines free
- pilot's position relative to the wing (centred: all lines same tension)
- wind direction
- obstacles on the ground
- free airspace

When laying out the glider, the wind direction should be observed. The canopy should be deployed into the wind so both halves of it are loaded symmetrically. The paraglider should be arranged in a semicircle against the wind. This ensures that the A-lines in the centre section of the canopy will tension before the ones at the wing tips. Thus the canopy inflates evenly and an easy launch in the desired direction is guaranteed.

All lines and risers should be carefully untangled and arranged in a way that they do not catch on anything.

It is equally important to untangle the brake lines so that they are clear and can not catch on any thing during launch. The brake lines should run freely through the pulleys to the trailing edge of the canopy.

Make sure the risers are not twisted; this can prevent the brake lines from running freely through their pulleys.

It is often impossible to untangle lines during flight.

It is important that no lines are looped around the canopy. Also called a “line-over”, this may have disastrous consequences during take off. Finally connect the risers with your harness by using the main karabiners. Check carefully that they are closed properly.

Launch:

The Muse 3 is very easy to launch. This is possible in almost all wind conditions except strong headwinds. Before take off recheck the canopy, the direction of the wind and the air space around you! When the pilot is ready to take off he/she holds all A-risers and the brake handles in each hand. To facilitate differentiation between the risers, the A-lines, including the sleeves on the A-risers, are coloured red. Before take-off, place yourself centrally at the gliders axis. Let the B-, C- and D-risers fall into the crook of your arm and hold the A risers with arms outstretched behind you. Pull up the canopy dynamically using the A-risers. (The stronger the headwind the less run-up you need to pull the canopy up). After the initial effort of inflation, keep applying forward pressure on the A-risers (pushing them forward, not pulling down) until the pressure on the A risers eases. The canopy should now be directly over the pilot's head. As soon as the glider is above you, stop pulling on the A-risers. A good progressive run ensures your Muse 3 will inflate and come up equally and quickly. Should the canopy surge forward, control it by braking gently. Now do a visual check upwards, to ensure the canopy is completely open (otherwise, abort the take-off). Only then is the final decision to continue the launch taken! If anything is not completely safe the launch should be aborted!

Now accelerate continuously until you lift off. It is easier to take-off in a light headwind if after reaching minimum flying speed you apply the brakes slightly. After the take-off, gently release the brakes again.

The paraglider should be braked gently to stabilize the glider and possibly correct for drift. Moving the pilot's body to the centre of the glider is the best method of correction, if there is sufficient room.

WARNING!! Do not use the forward launch in very strong winds. Make sure you don't pull the risers too much towards yourself or downwards as this can result in a frontal collapse, or in an asymmetric take-off.

The Muse 3 is easy to reverse launch. When doing a reverse launch or when launching in strong winds the paraglider can possibly surge forward more quickly or lift off sooner than desired. To avoid this, walk uphill following the canopy during inflation. As this launch technique can be difficult and turning the wrong way can result in the pilot taking off with twisted risers. It is recommended to practice the reverse launch on a training hill or slight slope first. When deflating the canopy in strong winds, or aborting a launch, use the C- or D- risers, not the brakes. Using the brakes in strong wind will cause more lift, lifting the pilot up and dragging him/her much further back.

If you let the brake handles go out of your hands during take-off, take care that the brake line is not twisted around the brake pulley

Flight:

The glider is delivered with a standard set-up and its speed can reach 36 - 38 km/h depending on the weight of the pilot. Always fly with sufficient clearance from the terrain. The Muse 3 glides best with open brakes, descends best with lightly applied brakes. In turbulence fly with brakes lightly applied (10-15 cm) to avoid canopy collapse. If the canopy pendulums forward, this should be corrected by prompt braking. A pendulum movement of the canopy backwards is corrected by loosening the brakes in good time.

In a calm air the Muse 3 can reach its minimum speed (depending on the wing loading) by application of 60cm up to 65cm of the brake range.

Accelerated Flight:

When flying with the speed system applied the angle of attack is lower and the canopy can collapse more easily than in normal (trim) flight. The faster the canopy is flown the more dynamic the collapses and stalls will be and the more skill will be required for quick recoveries. Therefore do not use speed system in turbulent conditions, close to the ground or near other airspace users. Always fly with sufficient clearance from the terrain and always keep the brake handles in your hands!

To use the speed system, simply place your feet on the stirrup and push forward in a horizontal plane. If a loss of back pressure of the stirrup on your legs is noticed, this is a warning that the canopy is probably about to collapse. Release the stirrup and thus the speed system immediately. With this feeling you may actually prevent most collapses from happening while using the speed system. If a collapse should still occur, release the speed system immediately and correct the collapse as described below.

Attention: Do not apply brakes when fully accelerated! Braking increases lift near the trailing edge. The main lift point moves backwards. Due to this the wing can loose stability for a short time.

Steering - turns:

The Muse 3 is a very responsive paraglider and reacts very directly and instantly to any steering input. Weight shift input quickens turns and ensures minimal height loss. Any weight shift has a greater effect the more loosely the chest-strap is fastened. A combined technique of weight shift and pulling on the inside brake line is the most efficient turning method, whereby the radius of the turn is determined by the amount of

inside brake pulled and weight shift. A stalling wing tip announces itself by a gentle surge backwards of the wingtip. If this occurs you will need to release the brakes immediately.

In case it is impossible to control the Muse 3 with the brake lines the D-risers may be used to steer and land the canopy. Attention! Pulling brake too fast or too hard can result in the canopy entering a negative spin.

Active Flying (Thermaling and Soaring):

In turbulent conditions the glider should be flown actively with brakes lightly applied to avoid canopy collapse. This improves stability by increasing the angle of attack of the canopy. The canopy should not rock back or surge forward much but should remain above the pilot. In turbulent flight, if the canopy pendulums forward, this should be corrected by prompt braking. A pendulum movement of the canopy backwards is corrected by releasing the brakes in good time. This is part of basic active flying.

Approach and Landing:

To avoid excessively demanding situations on the approach to landing, it is important to initiate the process at an adequate altitude. This leaves you enough time to observe and appropriately deal with wind direction and any other aircraft in your vicinity.

The Muse 3 is easy to land. The final leg of the landing approach must be into the wind. During this final glide the paraglider should be decelerated slowly and at approximately one meter above the ground, according to conditions, the pilot should flare the canopy. The glider may climb again, gaining height, if too much brake is used too early. Strong wind landings require correspondingly less brake. Do not apply full brake before the pilot is safely on the ground. The final glide during the landing approach should be straight and not marked by steep or alternating turns as these can result in a dangerous pendulum effect near the ground.

Attention! Do not allow the canopy to fall onto the leading edge with energy. This can destroy the material and affects the life of the ribs at the leading edge!

TOWING

The Muse 3 is certified for towing. The Muse 3 has no out of the ordinary towing characteristics, although a relatively low angle of attack and thus low tow tension should be maintained during launch and the initial part of the tow. The Muse 3 has no tendencies towards deep stall/parachuting. Therefore we allow tow- launched flights with a similar technique to that described above. There is sufficient margin to counter-steer the glider in a normal towing situation. Make sure you use proper equipment, experienced personnel and all relevant safety precautions for towing. We recommending the use of a winching adapter: this should be mounted on the upper end of the main karabiner.

WARNING!! Please always ensure that the brake lines are adjusted to the lengths recommended here. Setting them shorter could lead to a tendency to stall during towed flight. Apart from this, there are no special procedures.

MOTORISED FLIGHT

Muse 3 is certified for powered flying.

Note!! Although, motorized flight can be a great success due to the gliders very easy take-off characteristics, stability and good handling, always use a certified combination of engine - harness and glider. If in doubt check with your federation. Contact the manufacturer or importer for the current legality of motorized flight.

WARNING!! The Muse 3 is not suitable for jumps from aircraft.

WARNING!! The Muse 3 is not designed to be used for aerobatics.

EXTREME FLYING MANOEUVRES

This section describes flying conditions which can be deliberately induced, or which can develop unintentionally due to turbulence or pilot error. Any pilot who flies through turbulence is sure to be faced with these special flight conditions at some point. So take a good look at these flight manoeuvres or prepare for them by SIV (safety training over water). Mastering these flying conditions significantly improves your active flight safety. Sufficient height, as well as the carrying of a reserve parachute, is imperative.

WARNING!! All the critical flight conditions described here require thorough knowledge; otherwise carrying them out may be very dangerous. Sufficient height above the ground is imperative. Bear in mind that all disturbances of the canopy can increase the sink rate by 2 - 10 m/sec, depending on the degree of disturbance. Carrying out these manoeuvres wrongly may lead to a crash.

Remember this is a glider with unspectacular reactions to disturbances in the air. Whenever in doubt, raise the brakes and let the glider fly. The glider has a high internal pressure, resistance to tucking and very high degree of passive safety. It is recommended that at this stage you already practise an active flying style. The key to active piloting is keeping the glider above your head at all times. We recommend in principle that you hold the brake handle in your hand whenever possible, or fly with your hands through the brake handles, to allow you to react immediately to any possible disturbances. .

WARNING!! If you fly with your hands through the brake handles, you may lose valuable time in activating the rescue system.

Asymmetric collapse:

A negative angle of attack can cause all or part of the leading-edge of the Muse 3 to collapse (e.g. in turbulent air). Basically the Muse 3 will re-open spontaneously from closures of up to 70% with a change of direction of up to 90°. The time this takes, and the associated height loss, can however be noticeably reduced by appropriate action by the pilot. Apply opposite brake on the inflated side, the outside of the curve, to stop the turning movement of the canopy. This should be accompanied by appropriate weight-shift. If you react immediately, 30% brake on the open side should suffice to hold the canopy on a straight course. In the event of a big collapse, this braking should be applied very carefully to avoid stalling the remaining inflated wing. The pilot's correction for direction can be aided by a pumping out the deflation; a slow, long pumping action of the brake of the deflated side of the wing helps the canopy to re-inflate. If the pilot does not correct, the Muse 3 usually self-recovers. However, if it does not self recover and the pilot does not correct the canopy can enter a stable spiral dive.

“Cravat” / Line-over:

In the event of some lines becoming tangled during flight (caused by whatever), the following action is recommended:

The pilot stabilizes the glider by gently applying the brakes. Please be aware that in this condition the brake pressure can be higher and the brake travel shorter.

Without pilot input a line-over will result in a stable spiral dive.

Here are the various options to untangle a line-over:

- pumping the collapsed side.

- pulling the stabilizer line or lines causing the problem.

- should both measures fail, it may be possible to untangle the line-over by inducing a full stall. This manoeuvre, however, should only be carried out by advanced pilots with experience in extreme flight situations and with sufficient altitude available.

Attention! If these manoeuvres fail or if in any doubt, the pilot should instantly use their emergency parachute system.

Front Tuck:

A front tuck can be induced by strongly pulling the A-risers or by sudden, heavy turbulence. The entire leading edge spontaneously collapses. Gentle braking on both sides will reduce the lateral pendulum motions and simultaneously accelerate re-inflation. The Muse 3 generally self recovers from an initiated front tuck.

When having a very large front tuck, a frontal rosette can happen (the wingtips move forwards: shaping a horseshoe). Gentle braking can avoid this deformation.

A quick recognition of the situation and a quick reaction by braking on both sides as long as the collapsed wing is behind the pilot helps the recovery and limits the altitude loss.

Parachutal stall (deep stall):

In a parachutal stall the paraglider has no forward momentum combined with a high descent rate. A parachutal stall can be caused by, among other reasons, a too slow exit from a B-line stall or severe turbulence. Porous canopies (UV influence) or canopies out of trim (stretched or shrunken lines) are much more susceptible to a parachutal stall and therefore should not be flown. These are some of the reasons regular checks should be carried out on your glider.

A wet canopy or temperatures below zero centigrade (0°C) may also cause a stable parachutal stall. The Muse 3 will usually spontaneously recover from a parachutal stall within 2-3 seconds. If the canopy remains in a parachutal stall, it is sufficient to gently push both A risers forward or to push the accelerator.

Attention! If brakes are applied while in a parachutal stall, the glider may suddenly enter a full stall!

If a parachutal stall occurs on landing approach, the pilot should prepare for a hard landing and make a parachute roll landing. In close proximity to the ground, due to the forward surging pendulum effect, a recovery may be more dangerous than a hard landing in parachutal stall.

Full-stall:

To induce a full stall, apply full brake on both sides. The glider slows down steadily until it stalls completely. The canopy suddenly surges backwards a long way. In spite of this uncomfortable reaction of the canopy, both brake lines must be consequently held down with all your strength until the canopy is stabilized (directly overhead). This usually takes 3-6 seconds. The Muse 3 generally flies backwards during a full stall but doesn't always form a front rosette. A frontal rosette can be formed by entering the full stall slowly. When entering (braking) fast, the canopy will not always form the desired front rosette. Attention! Always apply both brakes evenly!

To recover from a full stall, Smoothly release both brakes simultaneously until 90% of leading edge reopens, then release brakes rapidly. The glider ends the full stall on its own without surging forward.

WARNING!! If the brakes are released rapidly and asymmetrically, the glider may surge almost 90° and suffer an extensive asymmetric collapse.

The danger of overcorrecting and overreacting exists during all extreme flight manoeuvres. Thus, any corrective action must be gentle and steady and done with feel!

Spin (or negative spin):

Pulling brake on one side too fast or too hard can result in a negative spin. During a spin the canopy turns relatively fast around the centre section of the canopy while the inner wing flies backwards (hence the term negative).

There are two usual reasons for an unintentional spin:

- One brake line is being pulled down too far and too fast (e.g. when inducing a spiral dive)
- When flying at low speed one side is being braked too hard (e.g. when thermaling)

To recover from an unintentional spin, the pulled down brake line should be immediately released as soon as a spin is suspected. The canopy will accelerate and return to its normal straight and stable flying position, without losing too much height. If the spin is allowed to develop for some time, the glider surges a long way forward on one side and a dynamic asymmetric collapse or a line-over can occur. Gently apply the brakes to avoid side or central collapse of the canopy and the possibility of a cravat (one of the tips becoming entangled in the lines). See part collapses on page 15.

WARNING!! If you are LOW and are in an unintentional spin, or if the canopy is caught in a cravat USE YOUR RESERVE.

Wingover:

To induce a wingover the pilot flies consecutive alternating turns to gradually steepen the angle of bank. During wingovers with a high bank angle, the outside wing begins to unload. Further increase of the angle of bank must be avoided, because any possible resulting collapse may be quite dynamic!

WARNING! Full-stall, spin and wingover (over 90 degree angle of bank) are prohibited aerobatic manoeuvres and may not be performed during normal flying.

Incorrect recovery procedures or overreacting of the pilot may have dangerous consequences! Attention! The Muse 3 is not designed to be used for aerobatics.

Alternative (emergency) steering:

If for some reason it becomes impossible to control the Muse 3 with the brake lines the D-risers may be used to steer and land the canopy. Attention! Of course the range is much shorter (10-15 cm) then with the brakes. It is also possible to control the direction of the flight by pulling on a stabilizer line or by weight-shifting.

RAPID DESCENTS

Spiral dive:

A spiral dive is the fastest way to lose altitude, however, the very high G-forces make it difficult to sustain a spiral dive for long and it can place high loads on the pilot and glider. By tensing ones abdominal muscles and a higher body tension you can to some extent resist the high G-forces. Don't forget proper breathing! As soon as any, even slight, light dizziness or impaired vision is noticed the spiral should be exited immediately.

The Muse 3 has a very effective spiral dive. This allows rapid descent without stalling. To enter a spiral dive the pilot should weight-shift on one side while slowly pulling the brake gradually on the same side as weight-shifting. During a spiral dive the angle of bank can be controlled by increasing or reducing the amount of inside brake. When spiral diving the Muse 3 it is recommended that the outside brake is lightly applied. This helps stabilize the wing and enables an easier and safer exit from the spiral. To exit, release the inside brake slowly. The Muse 3 did not show a tendency to remain in a stable spiral during testing. At high sink speeds or if the pilot keeps his weight on the inside, the wing can stay in a continued deep spiral and has to be actively exited. This is done by weight shifting to the outside and gentler braking of the outside wing.

WARNING!! Nearly all gliders will have a tendency to stay in the spiral if the sink-rate exceeds around 15-m/s, depending on weight-shifting, wing loading and G-force. In fact most gliders need a counter-input to end a turn.

Attention! Due to energy retention, the glider will climb a lot after a deep spiral-dive release. If you apply inner brake and decelerate the glider for two or three turns, big pendulum effects can be avoided.

WARNING!! Practise spiralling with caution and lower sink-rates to get a feel for the gliders behaviour. A pilot who is dehydrated or not accustomed to spiralling can lose consciousness in a steep spiral dive!

Big ears:

When in big-ears, the horizontal speed is higher than the sink rate, unlike a spiral dive or a B-line stall. This rapid descent technique is used to quickly and horizontally exit a dangerous area in the desired direction. In order to collapse the outside wing, pull the outside A-lines.

When the pilot holds the outside A1-risers on both sides and pulls them down, the Muse 3 easily tucks the outside wings and enters a stable descent mode. The pilot keeps hold of the brake handles along with the outside A1-risers in his hands. By braking on one side and weight-shifting, the canopy remains steerable.

In order to increase the sink rate as well as the horizontal speed, this manoeuvre should be done together with use of the speed system. Apply the speed system after big ears are induced (step into the speed-bar before you grab the outer A1-risers). Big-ears substantially reduces the risk of canopy stability problems in turbulent air. To exit Big-ears release the A1-risers. The canopy does slowly self-recover. If not, or to quicken the recovery, the pilot can gently apply brakes to the glider.

WARNING! Never do big-ears in spirals, as this may drastically reduce the number of lines taking the already high loads, causing structural failure.

Attention! All rapid descent techniques should first be practised in calm air and with sufficient height so the pilot can use them in emergency situations! By far the best technique is to fly correctly and safely, so you never have to descend rapidly!

B-line stalls:

To induce a B-line stall symmetrically pull down slowly on both B-risers, until the canopy folds (parallel to its long axis). The airflow over the top surface is almost fully detached and the canopy enters a vertical descent flight mode without forward movement. Further pulling of the B-risers reduces the surface area more and increases the sink rate. (Up to 8 m/s) Be careful, pulling too far or too rapidly may cause a frontal horseshoe to form. To exit from this flight mode release the B-risers at first rapidly but then gently (1 sec). The canopy surges forward re-attaching the airflow over the top surface and resumes normal flight. When the B-risers are released, the brakes should not be activated. This will give the canopy the chance to gain speed and resume normal flight. On exit from a B-line stall on no account just release the B-risers, as this can cause overloading. If canopy does not recover apply both brakes gently to recover or pull the A-risers, until the canopy regains forward speed.

Summary:

For all extreme manoeuvres and rapid descents please note:

- first practise manoeuvres with an instructor during safety training!
- before inducing any manoeuvre the pilot must check that there are no other airspace users below him!
- during the manoeuvre the pilot must have the canopy within his view!

LOOKING AFTER YOUR PARAGLIDER

Looking after your canopy correctly will prolong the life of your paraglider.

Deterioration: a few tips:

- The canopy is mainly made of NYLON, cloth which, like any synthetic material, deteriorates through excessive exposure to UV. Hence, it is recommended that you reduce UV exposure to a minimum by keeping the paraglider packed away when not in use. Even when packed in the bag do not leave it in the sun.
- Keep the canopy and lines clean as dirt may penetrate into the fibre and damage the lines or the cloth.
- Ensure that the lines are not folded tightly. It's extremely important to avoid any sharp bending of the lines, especially the main lines. Pay careful attention to the lines to avoid damaging them. Any over stretching of lines apart from the strain imposed during normal flight, should be avoided as over stretching is irreversible.
- Be careful, not to allow snow, sand or stones to enter inside the canopy's cells: the weight can change the angle of attack, or even stall the glider; additionally the sharp edges can destroy the cloth!
- Check line lengths after tree or water landings. They can stretch or shrink lines.
- Never drag the wing over rough ground! This will damage the cloth on the wear points. When preparing the wing on a takeoff with rough ground, don't pull the wing over it (i.e. by pulling the brakes). Please try to pack the wing on soft ground.
- Uncontrolled strong wind takeoffs or landings can result in the leading edge of the canopy hitting the ground at high speed which may cause rips in the profile and damage the rib material.
- Clean the paraglider with fresh water after contact with salt water. Salt water crystal can reduce line strength, even after rinsing in fresh water. Replace lines immediately after contact with salt water. Also check canopy material after water landings, as waves can place uneven forces and cause cloth to distort in specific areas. Always remove gliders from the water by holding only the trailing edge.
- Prevent lines from catching on anything as they may be over stretched. Do not step onto the lines. Although the lines were tested with a bending test they can be damaged if stepped on whilst on a hard surface, or if they come into contact with sharp objects.
- Do not always fold the canopy symmetrically to the centre cell as this can cause constant stress on the centre cell (centre cell always to the outside).
- Clean the paraglider with water and a soft sponge. Do not use any chemicals or spirits for cleaning, as these can permanently damage the cloth

Storage:

- Store the paraglider in a dry space at ambient temperature away from chemicals and UV light.
- Never pack or store the glider wet. This shortens the life of the cloth Always dry glider thoroughly before any packing or storage.
- During transport it has to be considered, that some materials of the paraglider are temperature sensitive. Avoid subjecting your wing to high temperatures (e.g. the luggage space of a parked car in the sun)!
  When sending your wing as a parcel, take extra care with packing.

Repairs and checks:

- Tears in the canopy must be professionally sewn. Adhesive patches are only adequate for very minor damage.
- Repairs should only be carried out by the manufacturer, distributor or authorized workshops. Only original spare parts may be used!
- The lines must be checked after every 50 hours flying time and whenever the flight behaviour changes
- Any changes to the canopy lines or risers, except those approved by the manufacturer, will void the certificate of airworthiness.
- The Muse 3 must be checked as a minimum, after two years or after 100 flying hours by the manufacturer or authorized workshops.

Disposal:

- The synthetic materials used in a paraglider need professional disposal. Please send disused canopies back to us: we will dismantle and dispose of it.

In Conclusion:

The Muse 3 is a modern paraglider. You will enjoy many safe years of flying with your Muse 3 if you look after it correctly and adopt a mature and responsible approach to the demands and dangers flying can pose.

It must be clearly understood that all air sports are potentially dangerous and that your safety is ultimately dependent upon you. We strongly urge you to fly safely. This includes your choice of flying conditions as well as safety margins during flying manoeuvres. We recommend once more that you only fly with a certified harness, reserve parachute, and helmet. Also the certification placard must be present on the glider. Every pilot should be suitably qualified, have a valid license and 3rd party insurance.

The Muse 3 is delivered with a stuff-sack, Velcro compression strap, MAC PARA backpack, repair kit and user manual.

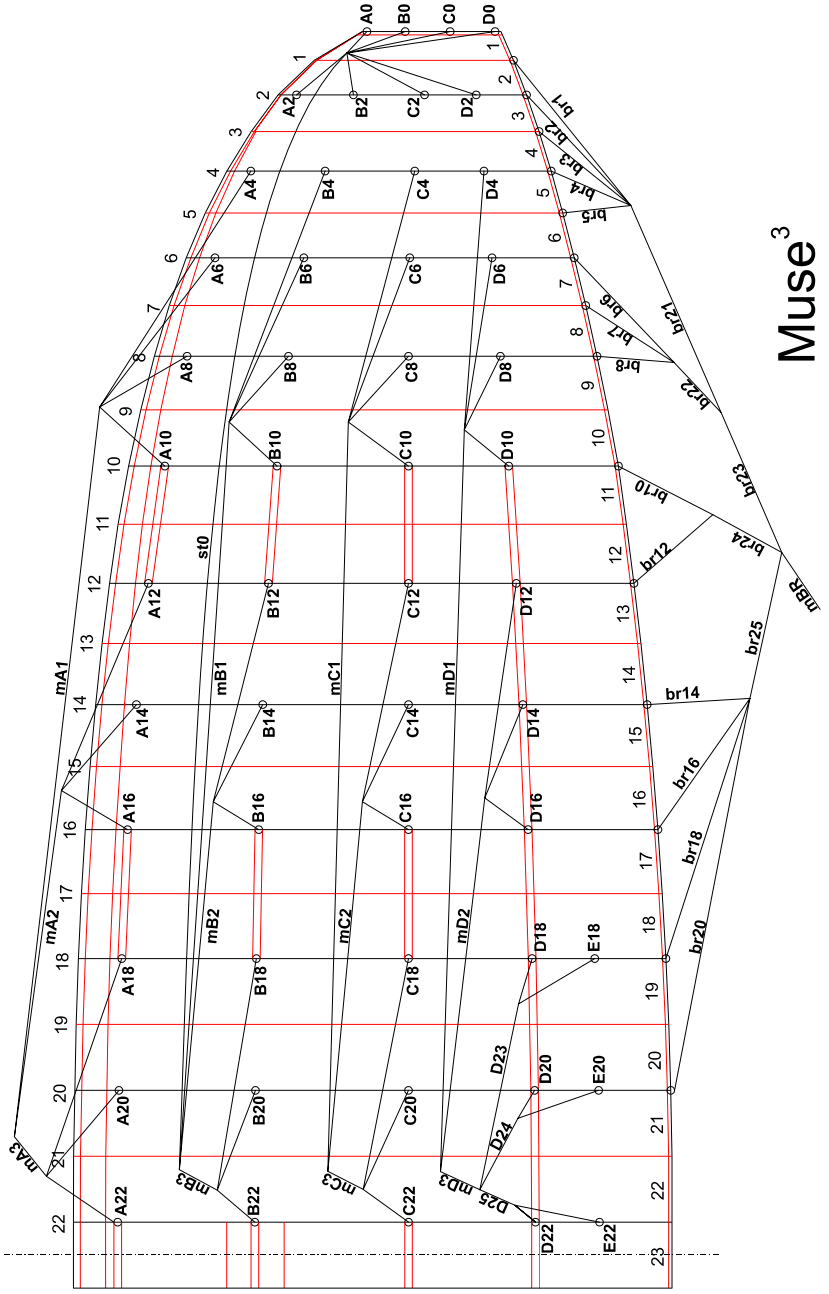
TREATING NATURE WITH RESPECT

Finally the call to practise our sport with respect for nature and wildlife! Don't walk outside marked routes, don't leave any waste, don't make needless noise and respect the sensitive biological balance in the mountain eco system: especially in the takeoff area!

LINE PLANS

Line descriptions:

The following printed line plans show the line configurations.


Muse3
A0
B0
C0
D0
A2
B2
C2
D2
A4
B4
C4
D4
A6
B6
C6
D6
A8
B8
C8
D8
A10
B10
C10
D10
A12
B12
C12
D12
A14
B14
C14
D14
A16
B16
C16
D16
A18
B18
C18
D18
E18
A20
B20
C20
D20
E20
A22
B22
C22
D22
E22
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D24
D25
br1
br2
br3
br4
br5
br6
br7
br8
br10
br12
br14
br16
br18
br20
br22
br24
br25
mA1
mA2
mA3
mB1
mB2
mB3
mC1
mC2
mC3
mD1
mD2
mD3
mBR
st0

Check-intervals

All paragliders used in flight must be checked at least every 24 months. For paragliders used by paragliding schools the period is 12 months.

Personnel authorised to carry out checks

A valid flying license and training course by National association are the basis for permission to carry out paraglider checks

Identification of glider

An identity sticker with details of certification and serial number is attached to the glider.

Components of the check

Porosity

The porosity should be checked with a porosity meter (JDC). Compare the resultant data with the producer's manual.

Porosity measures should be taken on at least three points of both the top and bottom surface. The first point should be placed 20-30 cm from leading edge in the middle of canopy. Second and third points are placed left and right from first measure point at 25% of the span. One additional measurement should be made on the top surface of the wing tip.

The identified time should be higher than 30 second (JDC). In the event of the result being less than 30 seconds, the result of the check is a fail.

Overall strength check

The check of canopy strength should be made with a Bettsometer (B.M.A.A approved Patent No. GB 2270768 Clive Betts Sales). On the top and bottom surfaces make small holes with a needle at the Aline attachment points. The exact verification should be made in accordance with the Bettsometer user manual.

Line strength check

Line strengths should be as specified in accordance with the certification requirements. One main line should be taken from each array and have its strength checked with a tension-meter.

Required strengths should be higher than:

- A + B main lines x measured value > 8 x maximum take-off weight and higher then 800 kg for the A + B arrays.
- C + D mean lines x measured value > 6 x maximum take-off weight and higher then 600 kg for the A + B arrays.

Replacements for damaged lines must be with new original lines. Line lengths are taken from the lines data page.

Line length measurement

Lines should be separated and each line measured under a tension of 5 kg. Measurement is made from the line karabiner to the canopy according to the method of certification. Rib numbering begins in the middle of canopy and leads to the wing tip.

Measured full lengths should be documented in the inspection record and are compared with certified full line lenghts protocol. Lengths should not differ by more than 20 mm. The opposite sides should be checked for symmetry.

Canopy line-attachment points check

Attachment points should be checked for damage and stretching. Defects, loops and flares should be repaired.

Canopy fabric check

Ribs, diagonal ribs, top and bottom surface should be checked. Any damage to sewing or tears to the fabric, which could influence flying characteristics must be repaired.

Lines

All lines should be checked for tears, breaks any damage to the sheath or signs of wear. Special attention should be paid to the sewing of the line loops. Damaged lines must be replaced.

The results should be documented in the inspection record.

Connector check

All line carabineers, trimmers (if used), speed systems and pulleys should be inspected for visible damage. Open or improperly secured connectors should be secured in accordance with the producers recommendations.

Risers

Both risers should be checked for tears, signs of wear or any damage and measured with a pull of 5 daN strength. Measured data should be documented in the inspection record. The difference must not be higher then 5 mm when compared to specified lengths.

Final check

The glider sticker and check sticker must be inspected for readability and correctness. The check must be documented with date, signature and stamp on the canopy and in the user manual.

CHECKS			
Name	Company	Date	Signature & Stamp

TEST FLIGHT CERTIFICATE

Paraglider type: **MUSE^3 –**

Serial number: _____

Test flown on: _____

by

MAC PARA TECHNOLOGY

_____

Confirmation by dealer: _____

TECHNICAL DATA

Category Intermediate size		Muse^3 24 (S)	Muse^3 26 (M)	Muse^3 28 (L)	Muse^3 31 (XL)
Zoom flat	[%]	92	95,7	100	104,5
Area flat	[m^2]	23,75	25,7	28,06	30,64
Area projected	[m^2]	21,78	23,56	25,73	28,1
Span flat	[m]	10,90	11,34	11,85	12,38
Aspect ratio flat	-	5,0	5,0	5,0	5,0
Root cord	[m]	2,69	2,79	2,92	3,05
Cells	-	45	45	45	45
Weight	[kg]	4,95	5,1	5,3	5,6
Weight range*	[kg]	67-85	75-95	85-110	105-135
Min.speed	[km/h]	23-25	23-25	23-25	23-25
Trim.speed	[km/h]	36-38	36-38	36-38	36-38
Max. speed (accelerator)	[km/h]	45-47	45-47	45-47	45-47
Glide ratio	-	8,3	8,3	8,3	8,3
Min. Sink rate	[m/s]	1,05	1,05	1,05	1,05
Weight range paramotoring	[kg]	89-113	100-127	113-147	140-180

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